De SCHWEINITZ (G.E.)

Perimetric Observations on the Influence of Eserine and Iridectomy in Chronic Glaucoma.

BY
G. E. DE SCHWEINITZ, M.D.,
Ophthalmic Surgeon to the Philadelphia and Children's Hospitals;
Opthalmologist to the Infirmary for Nervous Diseases;
Lecturer on Medical Ophthalmoscopy in the
University of Pennsylvania.

Read in the Section on Ophthalmology, at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May, 1891.

Reprinted from the "Journal of the American Medical Association," September 19, 1891.

CHICAGO:
PUBLISHED AT THE OFFICE OF THE ASSOCIATION.
1891.

PERIMETRIC OBSERVATIONS ON THE INFLUENCE OF ESERINE AND IRIDECTOMY IN CHRONIC GLAUCOMA.

BY G. E. DE SCHWEINITZ, M.D.,

OPHTHALMIC SURGEON TO THE PHILADELPHIA AND CHILDREN'S HOSPITALS; OPHTHALMOLOGIST TO THE INFIRMARY FOR NERVOUS DISEASES; LECTURER ON MEDICAL OPHTHALMOSCOPY IN THE UNIVERITY OF PENNSYLVANIA.

The best treatment for chronic glaucoma has often been discussed, but even at this time considerable difference of opinion exists in regard to the most satisfactory method, while the prognosis of the disease, depending as it does upon many factors, always is a doubtful quantity even after the most skilfully performed surgical interference. Most surgeons will, I think, subscribe to the doctrine of Dr. Bull, who says, "It seems to be our duty to operate in cases of chronic progressive glaucoma, and the earlier the better." It is presupposed that the patient has previously been warned of the nature of this disease to progress towards blindness, and, as Priestley Smith has said, of the uncertainties which beset the operation.

When a case of chronic glaucoma is under observation and the surgeon is weighing the chances for and against operation, it becomes necessary not merely to test the acuity of vision, but to have frequent information in regard to the field of vision, although, no doubt, it is perfectly true, as Dr. Bull further has said, that the condition of the field of vision is no constant guide either in forming a prognosis as to the progress of the disease, or in deciding as to the time of operation. The picture of chronic glaucoma is a very familiar one, and we are all acquainted with the so-called simple varieties of the disease in which the front of the eye exhibits practically no signs of disease, the anterior chamber may be of good depth, and the iris prompt in its reactions to light and myotics, in which there is sometimes never any perceptible increase of tension, or this is only temporary in its character, but in which there is a shallow excavation of the disc, glaucomatous in its type, some decrease in vision, and contraction of the field.

Since the days of Laqueur the use of myotics in the treatment of glaucoma has formed an important part of the therapeutics of this disease, and there can be no question of the value of eserine and pilocarpine in acute and subacute forms of glaucoma, where for any reason it is necessary to delay operation, or where it may be wise to attempt a reduction of the tension before an operation is undertaken. It is very definitely ascertained that a myotic by contracting the

pupil lowers the tension, if this be abnormally raised, and that by the same action the meshes of Fontana's space are widened, helping in the absorption of the fluid. It is, however, also ascertained that strong solutions of eserine, especially if frequently repeated, are likely to irritate the ciliary body and cause a spasm of accommodation; indeed iritis itself is known to follow the too vigorous application of a strong solution of a drug of this character. The employment of eserine or pilocarpine in chronic simple glaucoma, especially if there is no decided increase of tension, and if the anterior chamber is moderately deep, does not seem to present itself as favorably as in those instances, where there is a distinct rise of tension, narrowing of the anterior chamber, swelling forward of the lenticular system, and probable blocking of the filtration angle. Nevertheless it is a very universal custom to prescribe eserine or pilocarpine in such cases while the surgeon is watching the disease and making up his mind as to the propriety of operative interference. Perhaps sometimes he is induced to order this drug by the feeling that he has applied a salve to his conscience if he has instilled a solution of a drug which is set down as one of the methods of treatment in glaucoma, although he probably believes with Nettleship that eserine, except very rarely, cannot stop the progress of chronic glaucoma. The following cases are reported as examples of the value of this drug in the management of chronic glaucoma when operative inter-

ference was declined, and illustrate graphically the influence of the drug in widening and maintaining the field of vision, and also its occasional entire insufficiency to control the desire.

Case 1. Chronic Simple Glaucoma; No subacute Attacks.—W. G. N., a man aged 72, an American by birth, applied for treatment November 11, 1890; has always been dyspeptic. He has had no recent severe illness except a pleurisy from which complete recovery has taken place. Some months ago his right eye appeared to him to be dim; he has never had any pain or any redness of the eye, "but thought his glasses were not right." In the right eye the pupil is prompt, the anterior chamber of moderate depth, the iris of good color, the cornea clear and not anæsthetic; the optic disc is a small, vertical oval, with a deep cup (—2.D.) passing completely to the edge on the temporal side and nearly to the margin of the nasal half. The disc is surrounded by a semi-atrophic crescent on the temporal side; there is a strong venous but no arterial pulse; T + ?; a few striæ in the anterior cortex of the lens. In the left eye, cornea, iris and pupil of the same character as just described; some striæ in the lens; an oval disc, rather gray but not cupped; there is a venous pulse. The field of vision of the right eye at this date is represented in figure 1, namely, distinct contraction of about twenty-five degrees upon the nasal half, and a narrow rim of contraction above and in the upper temporal portion. The field of vis-

ion of the left eye was normal in all respects. The patient's refraction was as follows:

O. D. + 1.s ◯ + .50c axis V $\frac{20}{30}$. O. S. + 1.s ◯ + .75c axis H $\frac{20}{20}$.

Eserine, gr. $\frac{1}{24}$ to the ounce was ordered three times a day. One week later the vision remained nearly the same ($\frac{20}{30}$ —) and the field of vision about the same with perhaps a slight increase of the contraction upon the nasal side. (Figure 2.) The strength of the eserine was now doubled, namely, $\frac{1}{12}$ of a grain to the ounce. One month later, December 10, 1890, the field presented the characters seen in figure 3, namely, the same contraction above and to the upper temporal side, but distinctly less contraction to the nasal side. There was no pain or discomfort, and the patient pursued his usual occupation, necessitating a deal of eye work.

Again, about a month later, January 3, 1891, he reported, stating that for some days his eye had felt uncomfortable, not exactly a pain, but a dull aching sensation with a curious feeling as if an insect was crawling back of it, and with increase in his dim vision. He had been somewhat irregular in the use of his eserine. The vision then was O. D. $\frac{20}{70}$, O. S. $\frac{20}{20}$, and the field of vision as seen in figure 4, namely the same peripheral contraction above and to the upper temporal side with a contraction which now extended more decidedly below, and in the lower and inner quadrant; the eserine of the same strength (gr. $\frac{1}{12}$ to the ounce) was used frequently

every three or four hours for a week, then gradually lessened to three times a day. In a week the field had returned to almost exactly the appearance it presented in figure 3. The treatment was continued, the patient occasionally taking nux vomica and strychnia in addition, and on the 16th of March, or four months after he was first seen, the vision was $\frac{20}{40}$ as at the original

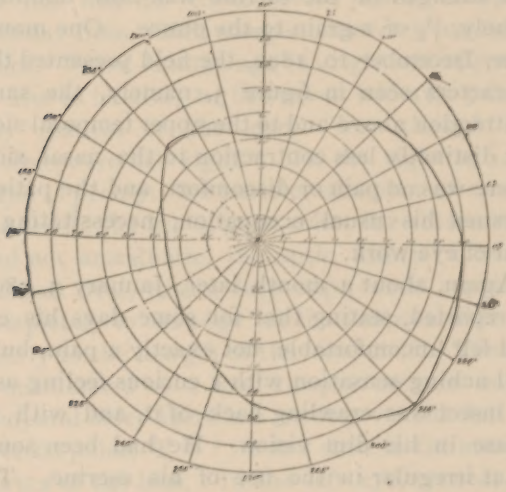

Fig. 1.

visit, and the field presented the characters seen in figure 5, namely, the peripheral contraction above and in the upper temporal portion had disappeared, and only a slight nasal contraction remained. This character of field obtains at the present time. It may be stated that this patient

was seen by Dr. Norris about six months before I examined him, and the same conditions were present which I had noted at his first visit. He was given eserine at that time and advised to use it, but he was not at all regular in its employment. We may hence say that for nearly a year this patient has used eserine off and on, and that

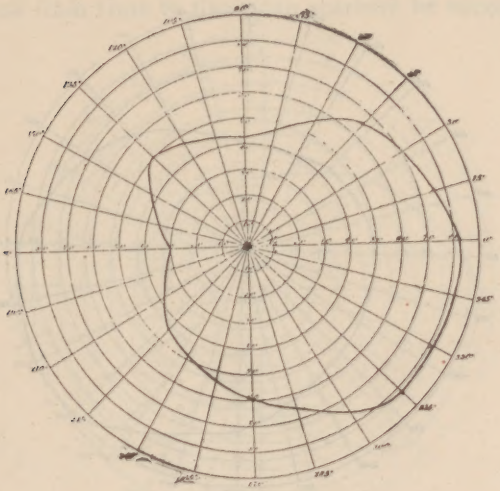

Fig. 2.

for five months of that time he has instilled a solution of the drug with pretty constant regularity.

I would note as points of interest the gradual widening of the field of vision in all particulars in so much that there is complete restoration of the upper and temporal portions, the only remaining portion of contraction being

found upon the nasal side which, at its widest part, is about fifteen degrees. There has never been any subacute attack, although on one occasion a dull, aching pain was associated with a depreciation of central vision and an increase in the contraction of the visual field, which again widened out under an increased frequency in

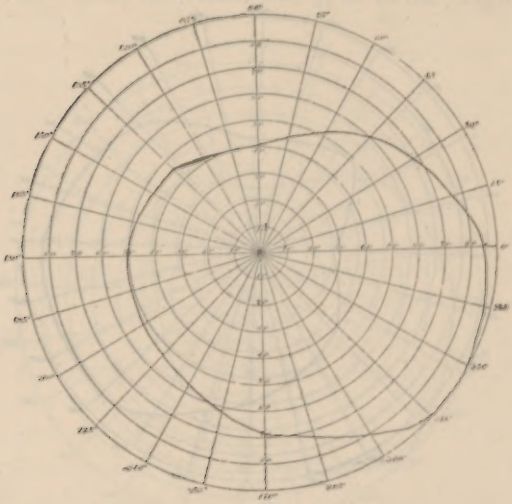

Fig. 3.

the use of the drug until the favorable result noted graphically in figure 5, was obtained and is maintained. If there is any favorable time for operation it certainly is present now. This has been advised and will be done provided consent is obtained. I would particularly point out that there has never been any increase in tension in

this case; in fact, the tension has always been a doubtful + so that it seems to show that even in the absence of a decided elevation of intraocular tension eserine has some power in improving the nutrition of the eye, and causes a restoration in a contracted field. The slight tonic doses of strychnia and nux vomica, which this patient took from time to time, can scarcely be account-

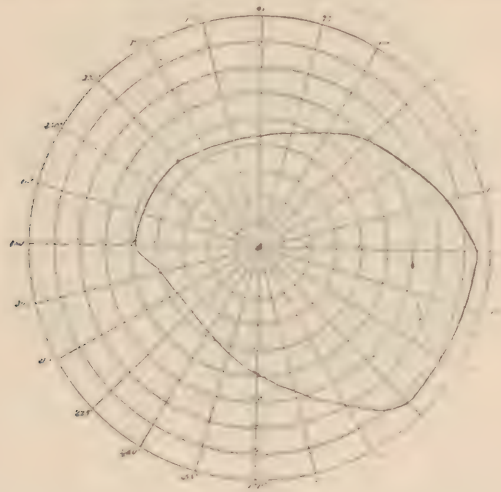

Fig. 4.

able for the favorable result, although I am convinced of the accuracy of the statement of Dr. Henry D. Noyes, that strychnia in high doses produces temporary improvement in vision, perhaps in those cases especially, which, as he says, border closely upon simple atrophy of the nerve.

2. Chronic Glaucoma: Numerous Subacute Attacks Occurring during the Course of the Disease, with Diagrams of the Fields of Vision Illustrating the Effect of Eserine in Controlling these Exacerbations.—Mrs. E., aged 50, an American by birth, came for treatment in September, 1888, complaining simply of dimness of vision in the right

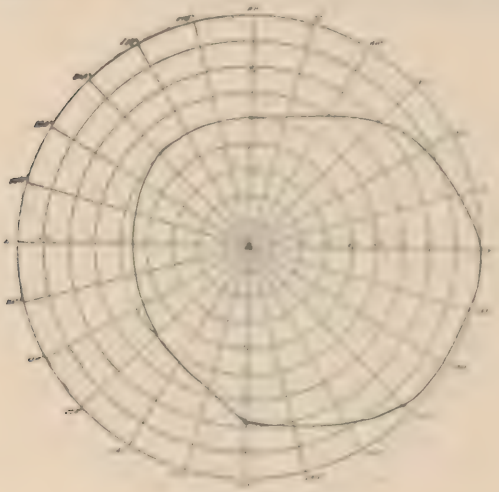

Fig. 5.

eye and inability to procure suitable glasses; headache and pain of any type was denied: the general health was perfect. The vision of the right eye was $\frac{1}{2}\frac{1}{2}$; of the left $\frac{1}{4}\frac{1}{2}$. In the right eye the cornea was slightly anæsthetic, the anterior chamber shallow, the disc round, excavated to its edges, especially deep above with an over-

hanging margin, beyond which and to the nasal side the papilla was surrounded by a buff-colored rim, in its turn encircled by a broad, halo-like band; T + 2; the iris was not atrophic. In the left eye the anterior chamber was shallow, but no anæsthesia of the cornea; the disc oval, gray-red; a small, rather sharp, central excavation,

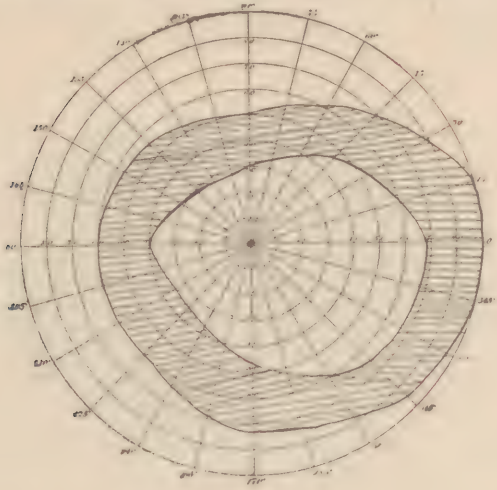

Fig. 6.

not shelving; the veins full, but not pulsating. The following results were procured by correction:

O. D. + 2.s ⌒ + .65c axis 15. $\frac{15}{20}$. O. S. + 2.25s ⌒ + .65c axis H $\frac{20}{15}$.

This was given for constant wear and eserine, gr. $\frac{1}{12}$ to the ounce, ordered, inasmuch as iridectomy was declined. The patient up to the pres-

ent date has used this drug almost continuously, except on a few occasions, when a slight conjunctivitis appeared and it was discontinued or had substituted for it pilocarpine.

She has had number of attacks of subacute glaucoma, the vision sometimes sinking to $\frac{2}{200}$, the cornea becoming slightly steamy, distinctly anæs-

Fig. 7.

thetic, and the episcleral vessels coarsely injected, the tension rising to + 2 or 3. All operation has been systematically declined and in all instances reasonable recovery has been produced by the use of eserine increased in strength and in frequency of application over and above what was continuously used. At present the best vision in the right eye is $\frac{1}{2}$; in the left eye $\frac{1}{3}$. Figure 6

represents the field of vision as it was found at the original visit, September, 1888, and as it has remained almost exactly on all occasions except during the exacerbations. It will be observed that it is of that form known as a concentric contraction, the limitation producing a band of darkened area varying from 20 to 25 degrees in

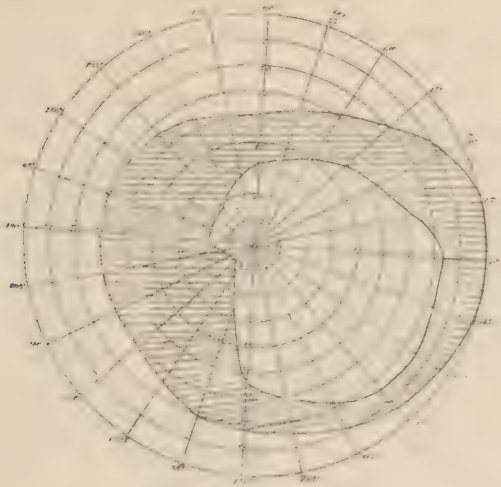

Fig. 8.

breadth, surrounding the preserved field of vision. Figure 7 represents the field of vision on the day of one of the subacute attacks. It will be observed that the field of vision under these circumstances assumes the type of a left lateral hemianopsia with concentric contraction of the preserved area. Figure 8 represents the field of

vision after twenty-hours' use of eserine, one-quarter of a grain to the ounce, instilled every two or three hours, and it will be noted that the blind nasal area is beginning to contract, or, rather, that the preserved field is beginning to push its way into this blind area. Figure 9 represents the field of vision two days later, the eserine having been decreased to four times a day. After this the

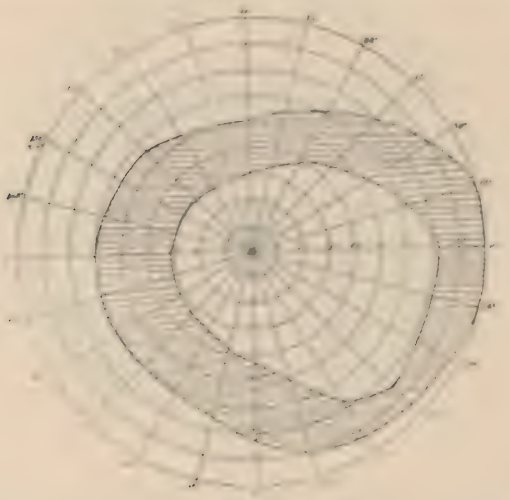

Fig. 9.

strength of the eserine was reduced again to one-twelfth of a grain to the ounce and used never less than twice a day. The visual field at the present time remains almost exactly as shown in figure 9, or, in other words, about the same as it was two and one-half years ago, there being

only a slight loss of less than ten degrees upon the nasal side. There have been a number of subacute attacks characterized by the symptoms just described: sinking of the vision, steaminess and anæsthesia of the cornea, increase in tension, rapid reduction of vision usually to $\frac{20}{200}$, and loss of the nasal half of the field, and in all instances the sequence of events has been that which has just been described.

It is proper to state that during the attacks full doses of chloral were also used, and, as we know, this drug is credited with an influence upon increased intraocular tension, and that the patient has continuously taken either nux vomica or strychnia, but never in very full doses. The points of interest in this case are its long continuance without very great loss in vision, the frequent subacute attacks which have resulted in reasonable cure under the influence of eserine, the form which the fields of vision assume in one of these attacks, namely, that of almost complete left lateral hemianopsia, and which, under the influence of the drug, gradually widens out until the lost nasal field is restored, and the entire field practically assumes the same proportion which it had before the attack. In fact, as has just been shown at the last examination, about a month ago, in spite of some loss of the central vision ($\frac{20}{40}$ as compared with $\frac{15}{40}$ at the original visit) the field is quite as large as it originally was, although not exactly of the same oval shape.

The indication for eserine in this case is

evidently very much more marked than in the one just reported, because in the first place more or less tension was always present, the anterior chamber was narrow, and in the second place during the exacerbations there was distinct rise in the intraocular tension. I cannot help believing that the eserine has been influential in preserving to this woman for more than two years the sight which she has.

Case 3. Chronic Glaucoma; Steady Progress Towards Blindness in Spite of Eserine and Full Doses of Strychnia; No Acute Attacks and No Pain.—James M., aged 60, of Irish birth, in January, 1890, began to notice before the one eye a spot which resembled the blue blossom on a blade of grass; he never had any iridescent vision nor was there pain or headache. He seems to have received no treatment for his eye until he came in September, 1890, or almost nine months later, when the following facts were ascertained: The dark spot no longer bothers him, but the vision has much depreciated; he is weak, somewhat nervous; has a chronic bronchitis; has used liquor frequently, of which use the injection of the superficial capillaries in the nose and cheek give evidence.

In the right eye the vision without correction was $\frac{1}{1}$; in the left eye $\frac{4}{5}$. In the right eye the pupil was prompt, the disc a horizontal oval, gray, with a scleral ring all around, the edges slightly veiled; no excavation and the choroid woolly. In the left eye the pupil very slug-

gish and slightly larger than its fellow; an oval disc, a shallow glaucomatous cup, passing entirely to the edge, which is slightly greenish all around, and beyond a halo-like annular absorption band assuming a triangular shape above; the veins very tortuous, the choroid woolly and disturbed; the tension distinctly +. The field

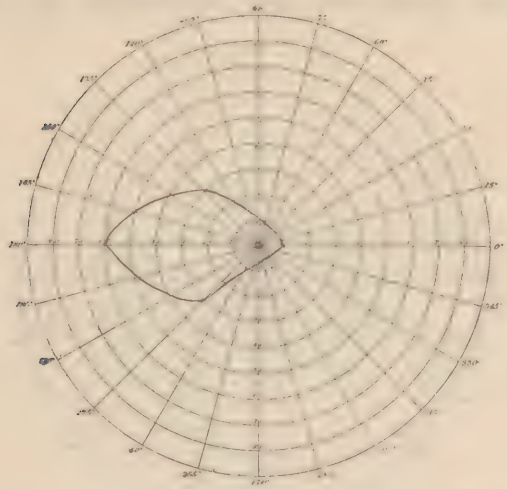

Fig. 10.

of vision is represented in figure 10, showing practically entire loss of the nasal half, and a somewhat trowel-shaped preservation upon the temporal side. Eserine, a sixth of a grain to the ounce, was given, and the patient reported very irregularly, having declined operative interference.

On January 19, 1891, the vision in the right

eye was $\frac{2}{4}\frac{0}{0}$ without correction, but with correction, namely, + 1.s ⌒ +.90c axis 15 $\frac{2}{2}\frac{0}{0}$; in the left eye $\frac{2}{2}\frac{0}{0}_0$, barely. The field of vision is represented in figure 11, namely, entire loss of the nasal half and a very small irregular patch of preservation upon the temporal side. Eserine or pilocarpine, the latter in twice the strength of the former, was used continuously, and the

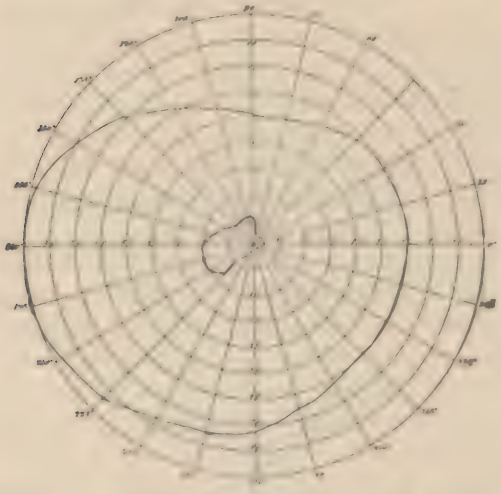

Fig. 11.

patient took sometimes iodide of potash, and sometimes very full doses of strychnia. A month later the vision had declined to counting fingers at two feet, the lens showed numerous, fine dot-like opacities, and the dirty green color of the disc had increased. Still a month later the field of vision is represented in figure 12, a still

further increase of the blind area having taken place, so that now only a patch fifteen degrees wide at its greatest diameter remains. Last month the condition was about the same, fingers being counted eccentrically at about one foot. Thus far the right eye has not shown any glaucomatous signs, although he occasionally sees black spots in the field of vision.

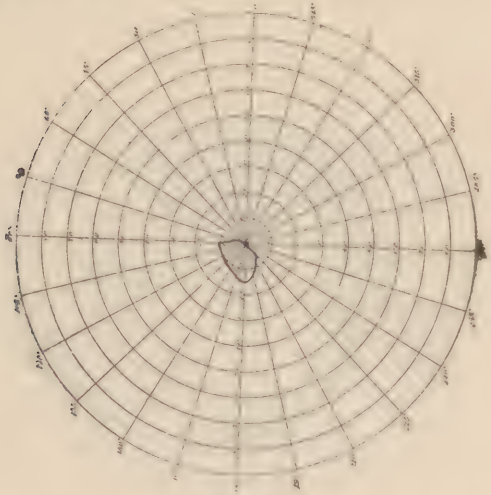

Fig. 12.

This is a good example of the steady progress of chronic glaucoma towards blindness in spite of medicinal treatment, and the fields of vision illustrate this well. Whether the process could have been stayed when the man first reported, in September, 1890, by an operation, it would be pure speculation

to answer. Even at that time the contraction of the field of vision was dangerously close to the fixing point, and perhaps that unfortunate result which has followed iridectomy in cases of this kind would here also have occurred.

Case 4. Visual Fields Illustrating the Effect of Iridectomy in Simple Chronic Glaucoma.—Mrs. X., an American by birth, had passed her sixti-

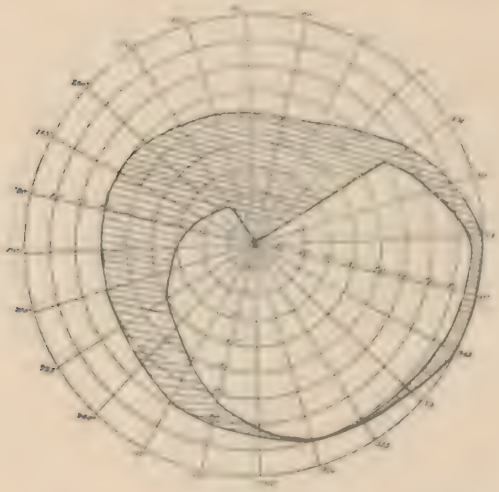

Fig. 12.

eth year, and applied for treatment in June, 1889, complaining of loss of vision, especially in the upper portion of the field of the right eye, a frequent desire to change her reading glasses, dull aching pain in the eyeballs, and occasional neuralgia through the trigeminal distribution. The

patient has chronic dyspepsia, is excessively nervous, and often the subject of insomnia. The vision in each eye was $\frac{8}{10}$; this rose by means of a correction as follows:

O. D. + .50s ⌒ + .50c axis 15 $\frac{20}{15}$. O. S. + .50s ⌒ + .50c axis 165 $\frac{20}{15}$.

The pupils were small and active, the anterior chamber shallow, the irides not atrophic. In the

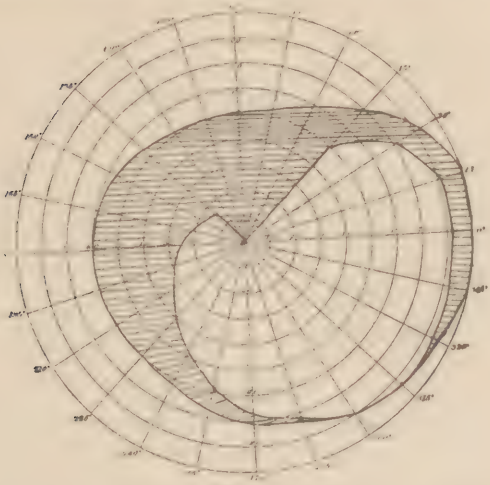

Fig. 14.

right eye the disc was a horizontal oval with a halo-like band surrounding it, and a complete shallow glaucomatous cup; pulsation of the vessels was readily induced by pressure. In the left eye the disc was oval, its axis 105 degrees, a deeper but not quite complete excavation, and a broad band surrounding the papilla. In the right

eye T. + 1; in the left eye T. + ?. The field of vision showed in the right eye somewhat concentric contraction and loss of the upper and inner quadrant; in the left eye slight peripheral contraction.

The patient was fully corrected and put upon eserine in the usual dose. Frequent examinations of the fields of vision, as well

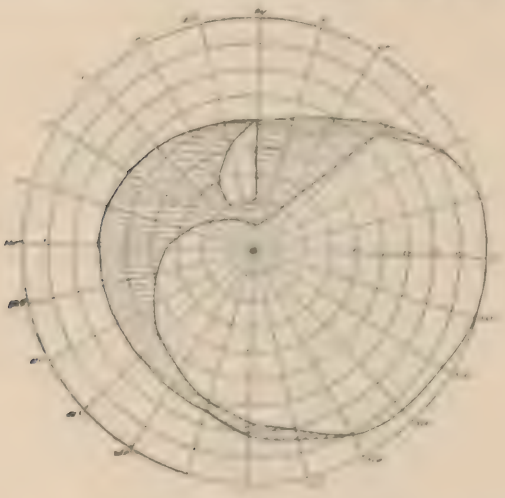

Fig. 2.

as of the central vision, were made at short intervals. Very little change took place for the worse until about the first of the year 1890, then, after a prolonged siege of nursing followed by a pretty sharp illness (bronchitis), there was marked depreciation of vision, which fell to $\frac{2}{3}$ in the right eye, but remained at $\frac{4}{4}$ in the left.

Eserine and pilocarpine were alternately used, and iridectomy advised. This was declined, and the patient did not make up her mind to submit to operation until June, 1890. Then, as the vision again failed, a broad peripheral iridectomy by the upward section was made on the right eye.

Figure 13 represents the field of vision of the right eye nine days before the operation, a form which had varied very little during the entire course of the disease. Figure 14 represents the first field of vision taken after the iridectomy was performed; that is, eighteen days subsequent to the operation, at which time the central vision was $\frac{20}{40}$ — and the astigmatism exactly doubled, requiring now a + 1c cylinder with its axis at 15 for its correction. It will be noticed that the field is almost exactly the same as that taken nine days previous to the operation. Figure 15 represents the field of vision in December, 1890, or almost exactly six months after the operation. It will be observed by comparing it with the other charts, that the preserved field has widened, that the area of lost vision is now occupied by an irregular triangular patch 30 degrees in its length, and varying from 5 to 30 degrees in its width, situated directly upward, like an island in the dark area. In this patch the patient appreciates the passing of an object without being able to distinguish its quality. Thus, a circle of white on a black background is simply appreciated as an object, not as a circle of white. The

dark area no longer touches the fixing point above, but there is an area of about 10 degrees in which the vision has returned. The central vision is now $\frac{20}{40}$ full and $\frac{20}{30}$ partly. There has been no increase in the glaucomatous process.

I would note, then, as points of interest in this case, that the iridectomy checked the process, doubled the astigmatism, caused gradual but none the less distinct improvement in the visual field, with a corresponding improvement in the central vision, and finally, was the means of a partial restoration of perception in a previously entirely darkened area. It is proper to state that this patient has been taking almost continuously digitalis, nux vomica or strychnia, in the hope of increasing the circulation in the optic nerve and improving its function. It is quite possible that the good result may have been contributed to by these drugs.